

DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE

MARINE MAMMALS

ADMINISTRATIVE AND STATUS REPORT OF MARINE MAMMALS

The following report of administrative actions and status of marine mammals under the jurisdiction of the Department of Interior is hereby published in the Federal Register in compliance with Section 103(f) of the Marine Mammal Protection Act of 1972 (Public Law 92-522). Administration and status of marine mammals is current as of 21 June 1973.

Administrative Actions

Thirteen applications for economic hardship exemptions under the Marine Mammal Protection Act of 1972 were received between 7 January 1973 and 21 June 1973. As of 21 June, eight of the requests have been acted on. Two exemptions were granted and six were denied. The remaining five applications are currently pending review by the Bureau.

The economic hardship exemptions granted were for scientific research and public display purposes. The scientific project will be conducted on three (3) adult manatees (Trichechus manatus) in the waters of Florida. Research will be conducted by Dr. Daniel S. Hartman, World Wildlife Fund, Manatee Research Project. The public display exemption was granted to Sea World, Inc., San Diego, California. The exemption provided for the taking of twelve (12) live Pacific Walrus (Odobenus rosmarus divergens) from the area around St. Lawrence Island, Alaska. The animals will be used to stock the Sea World of San Diego and Sea World of Florida facilities.

The six applications denied were for trophy walrus hunts in Alaska.

Summary

STATUS OF MARINE MAMMAL APPLICATIONS AS OF 21 JUNE 1973

<u>Type Application</u>	<u>Number Received</u>	<u>Number Approved</u>	<u>Number Rejected</u>	<u>Number Pending</u>
Scientific Research	2	1		1
Public Display	2	1		1
Hunting (Trophy)	6		6	
Other (skins, sale of ivory, sale of hides)	3			3

## STATUS OF MARINE MAMMALS

POLAR BEAR  
(Ursus maritimus)

Distribution and Migration: Polar bears occur only in the northern hemisphere, nearly always in association with Arctic sea ice. Centers for six geographically isolated polar bear populations which have been identified in the main polar basin are Wrangell Island-western Alaska, northern Alaska-northeastern Canada, northern Canada, Greenland, Spitsbergen-Fran Josef Land, and central Siberia. Separate populations also occur further south in Hudson Bay in Canada. Bears are most abundant near the southern edge of the sea ice but do occur throughout most of the polar basin and have been recorded as far north as 88° N. latitude. They make extensive north-south movements related to the seasonal position of the southern edge of the ice. In winter, bears off Alaska commonly occur as far south as Bering Strait and occasionally reach St. Lawrence Island and even St. Matthew Island in the Bering Sea. In the summer, north of Alaska, the bears commonly occur along the edge of the ice pack between 71° and 72° N. latitude. Pregnant females concentrate for winter denning and bearing young on large offshore Russian islands, northern Canadian islands, and certain of the Spitsbergen islands.

Abundance, Trends, and Harvest: Total population estimates, which range from a low of 10,000 by the Soviets to a high of 20,000 by the Norwegians, are based on broad assumptions and should be considered an approximation. Abundance of bears off the Alaska coast and the magnitude of sustained long-term harvests suggest that the 20,000 figure may be low. The number of bears seen per hour of flying by Alaska hunting guides has not shown a consistent change since 1956 when data were first collected. Sex composition of the Alaska harvest, between 70 and 80 percent males each year since 1961, has also not shown a tendency to change. Selective hunting has reduced the percentage of mature males in the population. The high percentage of females with young in the population indicates a healthy rate of reproduction. Age composition of bear harvest west of Alaska has not shown a trend in numbers. Age composition of bears harvested north of Alaska declined in 1970 and 1971 and then increased in 1972. The average annual Alaska kill during the 1930's, 1940's, and 1950's was about 120. It gradually increased to about 250 for 1960-1972. The U.S.S.R. believes that polar bear populations in the Soviet Arctic declined during the first half of this century and have now stabilized since hunting was stopped in 1956. Average annual harvests in Spitsbergen were about 300 prior to 1970 and have since been sharply reduced. The harvest in Greenland is 125 to 150 bears per year. Annual harvests in Canada approached 600 during the early 1960's and are now about 450.

General Biology: Polar bears, other than family groups of females and young, are solitary most of the year. During the breeding season in late March, April, and May, males actively seek out females by following their tracks on the sea ice. Bears are polygamous and a male remains with a female for a relatively short time and then seeks another female. Delayed implantation probably occurs. Pregnant females seek out denning areas, generally in October. Known denning concentration areas occur on Russian, Canadian, and Spitsbergen islands. Bears den along sections of the Greenland coast and to a limited extent on the north Alaska coast. Some denning occurs on heavy pack ice north of Alaska. Bears most commonly den under banks along the coast or rivers or on slopes where snow drifts. A denning female commonly forms a depression in the snow and then enlarges a denning chamber as snow drifts over her. Young, weighing between 0.4 and 0.9 kg, are born in December. A litter of two is the most common, one is quite common, and three is rare. The female and cubs break out of the den in late March or early April when the cubs weigh about 6.8 kg. They make short trips to and from the opened den for several days as the cubs become acclimated to outside temperatures. If the den is on land, the family group then travels to the sea ice. In most sections of the Arctic, young remain with the mother until they are about 28 months old. In Spitsbergen, family breakup occurs when cubs are about 16 months old; possibly milder weather and better feeding conditions allow them to develop faster there than in other areas. Females breed again at about the time they separate from their young; so normally they can produce litters every third year. Females can first breed at 3 or 4 and males at 4 years of age, but some animals are older at first breeding. Most bears do not live beyond 25 years. Mature females off the Alaskan coast weigh 181 to 317 kg and mature males 317 to 634 kg. Animals west of Alaska are larger than animals north of Alaska. Polar bears feed primarily on ringed seals and also on bearded seals, harp seals, and bladdernose seals. They occasionally eat carrion, including whale, walrus, and seal carcasses, and small mammals, birds, eggs, and vegetation when other food is not available. Approximately 60 percent of Alaska bears harbor Trichinella spiralis, apparently obtained from seals and other marine mammals, garbage, and possibly carcasses of other bears. Polar bear liver is toxic if eaten because of its high vitamin A content.

Ecological Problems: Long term climatic trends probably have a major impact on bear populations. Warming trends restrict areas that are suitable for denning and feeding, and cooling trends favor expansion of populations. Human development, especially that associated with oil extraction, poses the greatest immediate threat to polar bears. Oil exploration and drilling in denning areas could cause bears to den in less suitable areas. Oil spills from offshore drilling or transporting of oil through ice covered waters could reduce insulating value of bears' fur and also adversely affect the food chain below them. Ice would hinder or prevent containing of a spill, and currents could

distribute oil over large areas. Mercury and low levels of DDT and PCB's have been found in tissue samples of all Alaskan bears checked for these contaminants.

Allocation Problems: In Alaska after about 1950, trophy hunting with aircraft largely replaced Native hunting from the ground for subsistence and the sale of hides. Use of airplanes for hunting has been severely criticized in recent years, and some preservationists would like to stop even the small amount of hunting which coastal residents now do from the ground. The U.S.S.R. believes that bear stocks off the Siberian coast have been reduced and restricts taking to a few cubs for zoos. Until recent years, Norwegian sealers killed bears as predators, Spitsbergen trappers baited bears to set guns to obtain hides for sale, and trophy hunters took bears from Norwegian boats in the summer. The present belief in Norway is that only a few residents of Spitsbergen should take bears and that set guns should not be allowed. In Greenland the harvest is limited to Eskimos or long term residents primarily for subsistence and personal use of skins. The Canadian harvest has traditionally been by Eskimos for subsistence and to obtain skins for sale. Trophy hunting from the ground is starting in Canada and is being encouraged by managing agencies.

Regulations: In past years, regulations to limit polar bear harvests in Alaska were hunting seasons, bag limits, a permit system, limits on the number of hunts by individual guides, and protection for young and for females with young. Two management areas were established, one to the west of Alaska and one to the north of Alaska. Residents were allowed to hunt bears at any time for food, provided aircraft were not used. Hides and skulls of all bears taken had to be presented to the Alaska Department of Fish and Game within 30 days for examination, sealing, and removal of a tooth for age determination. Alaska banned the use of aircraft for hunting polar bears after 1 July 1972, and lengthened the season to encourage sport hunting from the ground. The Federal Marine Mammal Protection Act of 1972 assumed management authority for polar bears and limited their harvest to Alaska coastal Eskimos for subsistence or for manufacture of traditional Native articles of clothing or handicraft. The Marine Mammal Act removed restrictions on harvest of cubs and females with cubs by Natives. The demand for illegal trophy hunts and skins, and the difficulties of monitoring small aircraft operators on the high seas, will probably cause some significant enforcement problems. The U.S.S.R. has not allowed polar bear hunting since 1956. Norway has stopped set gun and trophy hunting and is now considering a 5-year moratorium on all harvesting because recent studies indicate that their polar bear population is smaller than previously believed. In Greenland only Eskimos or long term residents may take bears and the hunters must use traditional ground methods of hunting. In Canada, prior to 1968, Eskimos hunting from the ground took bears with few restrictions.

The Northwest Territories, where most bears are taken, has now established polar bear hunting districts with quotas. Trophy hunters may purchase a permit to take a bear from a district provided a resident is used as a guide. The five nations cooperating in polar bear studies are considering an interim agreement to ban hunting on the high seas until a treaty for management and research can be put into effect.

Current Research and Funding: The governments of Norway, Canada, and the United States are conducting intensive long-term investigations. The U.S.S.R. has a limited government research program and the Danish government is planning research in Greenland. Norwegian government funds are supplemented by grant and university funds. Short-term university projects complement government programs in Canada. The Federal Government and the State of Alaska fund the United States program. Research programs are coordinated internationally by the Polar Bear Specialist Group under the auspices of the International Union for the Conservation of Nature.

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SEA OTTER  
(Enhydra lutris)

Distribution and Migration: Populations in waters of the United States are resident (the sea otter is not migratory) along the west coast of North America from Central California north to Prince William Sound and westward along the Aleutian Chain to Attu Island (Kenyon, 1969). In waters of the U.S.S.R. the sea otter occurs at the Commander Islands, along the southern Kamchatka Peninsula and among the Kuril Islands (Nikolaev, 1961). It seldom ranges offshore beyond the 30 fathom (180 foot) depth curve (Kenyon, 1969).

Abundance and Trends: In 1956 the Alaska sea otter population, based on aerial surveys, was estimated at about 25,000 animals and increasing exponentially at about 4 to 5 percent per year; the world population was estimated at 32,000 to 35,000 animals (Kenyon, 1969, p. 200). In 1970 after additional surveys, the Alaska population estimate was 50,000 (K. B. Schneider, pers. comm., 1970). Refined techniques and additional surveys, using a variety of methods, yielded a 1972 Alaska population estimate of 100,000 to 125,000 animals and still increasing (Schneider, 1973). The Alaska Department of Fish and Game (1973) published a breakdown of sea otter population estimates according to Game Management units. The total estimates taken from this publication are 101,050 to 121,050 otters.

The sea otter has received a high measure of protection by both Federal and State laws since 1911 and is not subject to any aboriginal hunting. Prior to 1741, a large coastal native population had exploited the sea otter for some thousands of years (Laughlin, 1970; and Laughlin and Reeder, 1962). Thus, the sea otter today (where it has repopulated habitat left vacant by 18th and 19th century exploitation) is probably more abundant than it has been for centuries.

Otters from Amchitka Island and Prince William Sound were transplanted to the following locations: southeastern Alaska in 1965, 1966, 1968 and 1969 (total 413); British Columbia in 1969, 1970 and 1972 (total 89); Washington in 1969 and 1970 (total 59); Oregon in 1970 and 1971 (total 93); and the Pribilof Islands in 1959 and 1968 (total 64). (All transplant figures are from J. S. Vania and are contained in unpublished reports of the Alaska Department of Fish and Game and annual reports of the Marine Mammal Committee of the American Society of Mammalogists, 1965-1973.) Among transplanted otters, young have been observed in southeastern Alaska (J. S. Vania, pers. comm., 1973); British Columbia (M. J. Bigg, pers. comm., 1973); and Oregon (Jameson, 1973). Survival on release ranged from poor to excellent, so the numbers of animals reported transplanted is of variable significance.



California population counts are as follows: about 150 in 1938 (Bolin, 1938); 638 in August 1957 (Boolootian, 1961); 1014 in August 1968 (Peterson and Odemar, 1969); and 1060 in January, 1972 (Wild, 1972). Otters occur from Monterey Bay, California, south to Morro Bay and are extending their range north and south (Peterson and Odemar, 1969; and P. W. Wild, June 1973, pers. comm.). Wild (1972) estimates the total California population at 1,200 to 1,500 animals. The counts indicate that the population is following a nearly constant growth curve.

A refuge was established to protect the sea otter on the central California coast. When the refuge was established in 1941, it consisted of two separate areas, both in Monterey County. Area 1 extended from Malpaso Creek to Swiss Canyon Arroyo, which is just south of Pt. Sur. This refuge area consisted of about 15 linear miles of coast. There was a break, probably because the highway runs inland here. Area 2 began at Castro Canyon, *i.e.*, Pfeifer Point, and continued south to Dolan Creek, or on some maps Dolan Canyon, a distance of approximately 10 miles.

In 1959 the refuge was increased to a continuous linear distance of approximately 100 miles, beginning at the mouth of the Carmel River and continuing south to Santa Rosa Creek near Cambria. The area is open to sport abalone fishing for its entire length and is only partially closed to commercial abalone fishing. Commercial abalone fishing is permitted south of Yankee Point.

A survey of 15 and 16 April 1971 showed that approximately 48 percent of the otters were outside of the refuge area. Of 902 otters counted, 275 were north of the refuge in the Monterey area and 162 were south of the refuge; three were recently seen near Santa Cruz.

No reliable figures are available for numbers of otters killed, but Ebert (pers. comm., 3 June 1971) reported 40 or 50 during the previous year.

General Biology (from Kenyon, 1969): The sea otter is the largest member of the family Mustelidae, reaching a length of 148 cm and a weight of 45.4 kg. It becomes sexually mature at about 4 years of age and bears a single young, weighing approximately 2.3 kg, about every 2 years. The pup nurses for 10 to 12 months, but during this period often takes solid food gathered by the mother. The mother is very attentive to her young. Most of the young are born during the summer but births, and mating, may occur at any season. Breeding behavior is promiscuous. A mating male and female remain together for as long as 3 days. The anatomy of reproduction was studied by Sinha, Conaway and Kenyon (1966). The dense underfur is about 1 inch long; the guard hairs are about 0.25 inch longer. A healthy animal may accumulate considerable body fat but there is no layer of blubber.

The sea otter is, therefore, dependent for insulation from cool (35° to 50° F.) marine waters on the air blanket retained among the 800,000,000 pelage fibers (V. B. Scheffer, in Kenyon, 1969, p. 32).

Mortality at Amchitka Island (the only area studied intensively) is greatest in winter and early spring. A dense population there depleted food organisms, and starvation occurred during stormy weather. Young, deserted by mothers during storms, accounted for 70 percent of the mortality. The remaining 30 percent were predominantly animals showing signs of old age. Most of the dead animals exhibited signs of starvation and enteritis. Internal parasites include Trematoda (4 spp.), Cestoda (2 spp.), Nematoda (1 sp.), and Acanthocephala (5 or possibly 6 spp.) (Dailey and Brownell, 1972). A nasal mite, the only ectoparasite found, is common in harbor seals but occurred rarely in the sea otter (infestation from contact on common hauling out places is suspected; Kenyon, Yunker and Newell, 1962).

Ecological Problems: In several Aleutian Island areas the sea otter has overpopulated its habitat and depleted food resources; population declines were observed (Kenyon, 1969, p. 167). Oil pollution of waters occupied by sea otters would be fatal to them. Pesticide residues have been found in California sea otters (Vandevere and Mattison, 1970), but the effect on them is unknown.

Allocation Problems: There is conflict over management of the population off the coast of California, because the sea otter is a predator of the abalone. An organized group (Friends of the Sea Otter, Big Sur, California 93920) want the population completely protected so that it can expand into its original range. Abalone fishermen, both commercial and sport, want the population controlled and limited to the refuge and areas where the abalone is not abundant.

From 1962 through 1969, the State of Alaska took 2,933 pelts for sale at auction, but the enterprise was of marginal financial success (J. S. Vania, pers. comm., 1973). No harvest of skins has been taken since 1969. The final sale of 402 skins took place on 9 February 1972.

Regulations: The sea otter is protected by the Marine Mammal Protection Act of 1972 (PL 92-522). In California it is listed as a completely protected animal.

Current Research and Funding of Sea Otter Studies: The State of Alaska employed one full-time biologist (Karl B. Schneider) from 1965 to 1973. The Bureau of Sport Fisheries and Wildlife employed one full-time biologist (Karl W. Kenyon) from 1955 to 1973. A new biologist will be assigned in mid-1973. The California Department of Fish and Game employs one full-time biologist (Paul W. Wild) and an assistant (Jack Ames). This program began in 1968 and continues. The Owings Foundation, privately endowed, employs Judson Vandevere as a full-time sea otter naturalist.

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**PACIFIC WALRUS**  
**(*Odobenus rosmarus*)**

Distribution and Migration: The entire population winters in the seasonal pack ice of the Bering Sea. When the ice was at maximum extent in April 1972, concentrations of walruses were found north and south of the west end of St. Lawrence Island and in central Bristol Bay (Kenyon, 1972). Areas of sparse abundance surround the areas of concentration. Ice movements caused by currents of wind and water create leads and break up pack ice. Walruses are thus able to feed in waters 30 to 42 fathoms (180 to 252 feet) deep.

In migration, there may be two or more peaks, depending on weather and ice conditions. From mid-May to early June most females and young move through Bering Strait with ice carried by strong currents. In mid-June large numbers of males move north (Burns, 1970). However, Brooks (1954) recorded that about 1,000 adult and subadult males traditionally remain throughout the summer on and near Round Island in northern Bristol Bay. In June 1958 Kenyon estimated the number there at 1,500 to 2,000 (Kenyon, 1960), and in 1966 Burns (1967) reported 2,000 to 3,000 on shore plus additional animals in the waters. Other haul-out areas may be used in winter. In 1962 and 1965 small numbers (100 to 150) were seen on beaches of Amak Island (Kenyon and King, 1965). Burns (1967) recorded that "several thousand" were hauled out on the east shore of Big Diomed Island in December 1966 and, at the same time, between 1,000 and 1,500 came ashore on the Puvuk Islands, south of St. Lawrence Island.

In the west, walruses haul out on Ruder Spit (Gulf of Anadyr), Arakamchechen Island (Bering Strait) and on Cape Intsova (in the Chukchi Sea) (Nikulin, 1947). At one site, Cape Intsova, Nikulin (1947) observed that the first walruses came ashore on 8 August and by 10 October there were about 8,000 hauled out.

During the northward spring migration into the Arctic Ocean, the majority of walruses pass through the western side of Bering Strait and proceed westward to Wrangell Island. Here, Krylov (1966) identified three types of hauling grounds: those used by mothers with young, those used by adult males, and those used by subadults. Few walruses and no mothers with young move eastward into the Beaufort Sea.

Abundance and Trends: Prior to large-scale exploitation by whalers of European descent which began in about 1868 (Allen, 1880, p. 185), the Pacific walrus was estimated to number about 200,000 animals (Fay, 1957). Fay (1957) estimated that the population may have fallen to a low of 40,000 to 50,000 in the 1950 to 1956 period. Beginning in 1960, aerial surveys of walruses were undertaken. From data obtained on the five surveys (two in 1960, one each in 1961, 1968 and 1972), total estimates were computed by extending the number of animals

observed in a 1 mile flight track to the estimated area occupied by walrus. From the 1960 surveys, the total population was estimated to range from 73,000 to 117,000 (Kenyon, 1960). The 1972 surveys provided a median estimate of 135,000 walrus, and a range of 93,000 to 178,000 (Kenyon, 1972). Bychkov (1971), quoting Shustov (1969), however, estimates the present population at 45,000 to 46,000. J. J. Burns has gathered much basic biological information from walrus taken by Eskimos. From this, his estimate of the walrus population approximates the computed mean of the 1972 aerial survey (pers. comm., 1973). He considers that the similar results obtained by the very different methods confirm a population of approximately 140,000 walrus. Studies of his material, as well as a comparison of the 1960 and 1972 surveys, indicate that the population may still be increasing. Burns (1967) considers, however, that the population will not continue to increase if the annual kill is increased.

Annual hunting mortality rates, using Ricker's (1948) "catch curve," are estimated as follows: 11 percent (Fay, 1955), 15 percent (Fay, 1960), 12 to 15 percent (Harbo, 1961), and 13 percent (Burns, 1967). Among males from 14 to 33 years of age, the mortality rate was 14 percent (Burns, 1967).

The take of walrus in Alaska in 1972 was about 1,350 animals (945 adult males, 270 adult females, and 135 calves) (J. J. Burns, pers. comm., 1973). This is about an average take. In 1966 the take was unusually high at 2,788 animals (Burns, 1967). Considering that about 50 percent of the animals killed are lost (Burns, 1967), the annual kill may range from about 2,700 to 5,600 animals.

General Biology: Only one pinniped, the southern elephant seal, is larger than the Pacific walrus. The following data are provided by Fay (MS). An adult male weighed 1,557 kg. The maximum standard length of 23 adult males was 356 cm. Among 26 adult females the maximum weight was 1,062 kg and the maximum length was 238 cm. From a sample of newborn young the maximum weight was 77 kg and the maximum length was 137 cm. Some females ovulate for the first time at age 5; others, more rarely, are delayed until age 8. Males become fertile at ages 7 to 8 years but are not physically mature until they are at least 10 years old. The walrus is polygamous, with a mid-season sex ratio of 5 cows to 1 bull in the main breeding area southwest of St. Lawrence Island. The gestation period, including a 3 to 3½ month delayed implantation, is about 15 months. The young are usually born in May, during the spring migration northward. Each female bears a single calf and nurses it about 2 years. The females and young are very gregarious; males are gregarious outside the breeding season. Studies of cementum layers in canine teeth indicate that walrus often attain ages of 20 to 30 years, with maximum ages of 37 years for a male and 26 years for a female.

Walruses, having a greater specific gravity than water, must rest on ice or land at fairly frequent intervals (Nikulin, 1947). By means of pharyngeal pouches that may be inflated, however, walruses are able to sleep while floating upright at sea (Fay, 1960).

Brooks (1954) recorded information on food habits. Clams (six species identified) are the most important food species. The stomach contents of an adult male contained about 50 pounds of Mya truncata siphons and 35 pounds of Clinocardium nuttalli feet. Other food includes echinoderms, annelids, sipunculids, and priapuloids. Occasionally individual adult males turn to a diet of seal flesh (Fay, 1960).

Parasites and Diseases: Internal parasites recorded from walruses include the following: Trematoda (3 spp.), Cestoda (3 spp.), Nematoda (6 spp.), and Acanthocephala (4 spp.) (Dailey and Brownell, 1972). All walruses except calves are infested with external parasites, including three species of sucking lice (Brooks, 1954). A small percentage of adult male walruses become carnivorous and feed on seal flesh. Probably it is this abnormal feeding behavior that accounts for trichinosis infection of from 1 to 10 percent of 1,060 male walruses sampled from four arctic region (Fay, 1960). Incidence of uterine cysts and other disease conditions is low, as far as is known, and such diseases and abnormalities appear to unimportant (Brooks, 1954).

Ecological Problems: Dredging for gold and offshore drilling for oil in the Bering and Arctic Seas are activities now under consideration by industry (J. J. Burns, pers. comm., 1973). The extensive clam beds, which furnish the basic food resource of the walrus, are not yet subject to human exploitation. If dredging for clams is undertaken, the food base of the Pacific walrus could be seriously threatened. Also of concern is the frequent harassment of walrus by aircraft when they are hauled out in summer on the Walrus Islands State Game Sanctuary (Togiak Bay), Bristol Bay.

Allocation Problems: Siberian and Alaskan Natives kill 5,000 to 6,000 walruses annually for subsistence, and less than 50 were taken per year by trophy hunters and for display in marine aquariums. Loss of walruses during hunting ranges from 20 to 60 percent and averages about 50 percent because of inefficient Eskimo hunting techniques. Additional waste occurs in the utilization of the products of retrieved walruses. If ivory is the primary objective, utilization amounts to as little as 1 to 3 percent of the potential. When meat and hides are used, utilization is as high as 90 percent of the carcasses taken (Burns, 1967).

Regulations: Trophy hunting was stopped by the Marine Mammal Protection Act of 1972 (PL 92-522). Requested trophy hunting permits by guides under the hardship clause were not issued by the Secretary of the Interior (J. S. Vania, pers. comm., 1973). The taking of walruses by Native Alaskans (Eskimos and Aleuts) for meat, hides, and ivory which

may be used to manufacture traditional artifacts for sale is permitted. PL 92-522 allows Natives to take an unlimited number of male and female walrus. The Alaska State law, which the Federal legislation invalidated, was more restrictive. It imposed a bag limit of 5 females per resident hunter with no limit on males (Burns, 1967).

Current Research and Funding of Walrus Studies: No full-time walrus research program per se has been established. The Bureau of Sport Fisheries and Wildlife in cooperation with the Alaska Department of Fish and Game furnished personnel and funded the aerial surveys. F. H. Fay, U.S. Department of Health, Education, and Welfare, has worked part-time for many years on walrus studies. In the 1973 hunting season the Alaska Department of Fish and Game maintained observers on St. Lawrence Island and on Little Diomed (J. S. Vania, pers. comm., 1973) and also on King Island (F. H. Fay, pers. comm., 1973) to monitor the kill. Studies have also been supported under the Sea Grant Program, University of Alaska.

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**ATLANTIC WALRUS**  
**(Odobenus rosmarus rosmarus)**

Distribution and Migration: The Atlantic walrus is found in open waters near ice in the Arctic and Atlantic Oceans. There appear to be two breeding groups: (1) Kara Sea to eastern Greenland and (2) western Greenland and eastern Canada. Most animals migrate south in winter and move north in the spring as the ice retreats. Stormy weather may occasionally force overland travel.

Abundance and Trends: No figures on numbers are available since 1967 when the estimate was 25,000. The average annual kill is estimated at 2,700 and the annual increment is believed to be between 12 and 20 percent. Any increase in kill would seriously jeopardize this subspecies. Herds in the Barents, Kara, and White Seas are reported to be close to extinction.

General Biology: This subspecies is smaller than the Pacific walrus with males averaging 680 kg and females 566 kg. Gestation period is thought to be 10 to 11 months with one young produced every other year. The young nurse for as long as 24 months.

Ecological Problems: Dredging or other disturbance of clam beds would probably threaten the primary food base of the walrus.

Allocation Problems: Eskimo hunters kill about 2,700 per year with the meat being used primarily for dog food and the tusks used for carving figurines and tools. The number of animals lost after killing is probably high.

Regulations: Since 1956 the U.S.S.R. has prohibited all hunting except that necessary to meet the needs of the Eskimo people. Denmark limits the take to Greenland residents using craft under 40 tons. Hunting areas and dates are also specified. Canada limits killing to Eskimos and a few white residents. The Atlantic walrus is not covered by Endangered Species Treaty.

AMERICAN MANATEE  
(Trichechus manatus)

Distribution and Migration: Manatees inhabit sluggish rivers, shallow estuaries, and salt-water bays of eastern North and South America from Florida and southern Georgia to Guiana, including the West Indies. There seems to be an irregular intermixing of animals between population concentrations in certain estuarine and riverine habitats. This intermixing is probably effected by offshore migrations. During winter cold spells, manatees congregate in warm-water discharges from power plants and natural springs.

Abundance and Trends: Manatees are classified as an endangered species. The total population in the United States probably numbers between 2,000 and 4,000. Manatees are increasing on the central west coast of Florida; elsewhere the number of animals appears to be stable or decreasing.

General Biology: Manatees are massive, fusiform, thick-skinned, nearly hairless aquatic mammals. The skeleton is dense and heavy (pachyostosis). The forelimbs are paddlelike, the hind limbs are lacking, and the tail is horizontally flattened. The cheek teeth are replaced consecutively from the rear. The maximum recorded weight is 680 kg; average weight is 360 to 540 kg. Maximum recorded length is 460 cm; average length, 300 cm. Their diet is strictly herbivorous, consisting of vascular aquatic vegetation found in fresh, brackish, or salt water. The gestation period is believed to be between 385 and 400 days. Manatees are uniparous; twins are rare. The calves are born and nursed in the water. Weights and lengths of calves at birth range from 28 to 32 kg and from 100 to 130 cm, respectively. The reproductive rate is probably one calf per adult female every 2½ to 3 years. The calves are born throughout the year.

Pleurisy and bronchial pneumonia from exposure to cold have been responsible for the deaths of captive manatees and may be the cause of fatalities in the wild during unusually low temperatures.

Ecological Problems: There is no indication that sharks, crocodilians, or other aquatic animals prey on manatees. Man appears to be the only threat to the manatee's survival in the United States. Wounds inflicted by boat propellers are apparently a chief cause of mortality among manatees. Also important is the destruction of the manatee's food resources following water contamination. Industrial effluents, notably in upper Tampa Bay, seem to have eliminated the plants on which the animals normally feed. In the St. Johns River a combination of two factors, dredging to facilitate passage of oil barges and spraying of herbicides to control water hyacinth, have in places drastically altered the composition and abundance of aquatic vegetation. In the absence of their preferred foods, manatees in the St.

Johns watershed have adopted water hyacinth as a substitute staple. The toll of manatees killed by vandals, poachers, and, inadvertently, by net fishermen, must also be considered in any appraisal of the species' future in the United States.

Allocation Problems: The use of manatees in small scale weed clearing operations is feasible but limited in Florida's temperate climate by the animals' need for warm-water refugia during cold weather. Difficulties involved in the capture, transport, and maintenance of manatees seem, at this time, to outweigh their utility. Another problem has been the failure of manatees to breed in a captive or semicaptive situation. Hopes to "farm" manatees as a potential source of protein are presently unrealistic. The vast number of animals required for sustaining a business, and the manatee's slow reproductive capability, should deter such ventures.

Regulations: The manatee is completely protected in the United States by the Marine Mammal Protection Act of 1972.

Current Research and Funding: Dr. D. S. Hartman is conducting a year-long study of the manatee's status and-distribution in Florida and Georgia (December 1972 through December 1973). The study is being funded by the World Wildlife Fund, the Office of Endangered Species (Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior), and the Friends of the Earth Foundation.

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DUGONG  
(Dugong dugon)

Distribution and Migration: The dugong lives in tropical bays and estuaries of the Red Sea, east coast of Africa, Bay of Bengal, Malay Archipelago, the Moluccas as far as the Philippines, New Guinea, and the tropical Australian coast. The species are tropical warm water animals not ranging far to sea or into fresh water, and never leaving the water.

Abundance and Trends: The dugong is nearing extinction in some areas with nearly all portions of its range showing a great decline. The only stable population appears to be that off the northern Australian coast.

General Biology: Dugongs are large fusiform marine mammals with a thick skin, heavy skeleton, flipperlike forelimbs and a broadly notched horizontal tail fin. Average length as adults is 250 to 320 cm and weight is 140 to 300 kg. Skin color ranges from blue-grey to brown. Males possess short tusklike incisors. Breeding apparently lasts throughout the year with a single young born after a gestation of 11 months. Calves are born and nursed in the water.

Ecological Problems: Man is apparently the major threat to the dugong's existence at this time although climatic changes are probably responsible for its historical scarcity. Dugongs are widely and intensively hunted for flesh, oil, hides and tusks. An adult dugong will yield from 5 to 6 gallons of oil, which is used for medicinal purposes. The "tears" and pulverized tusks are valued in some areas as aphrodisiacs. Keels and propellers of powerboats often inflict mortal wounds. Oil spills, effluent and general pollution of coastal waters are also potential dangers inasmuch as they affect the food plants and general health of the dugong.

Regulations: The dugong is totally protected in Australian waters, except that it can be taken by Aborigines for their own use. It is protected by law in many other parts of its range also, but the laws are seldom enforced. The species is listed in Appendices I and II of "Endangered Species" Treaty.

  
F. V. Schmidt

Acting Director  
Bureau of Sport Fisheries and Wildlife